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COURTSHIP IN *DYSDERA CROCATA*.

ALEXANDER PETRUNKEVITCH, PH.D.

A female and a male of this species of spiders were found under two adjacent flat stones on a sunny hillside in Montclair on the morning of April 21. On the same day they were put in a rectangular small glass dish with a little earth at the bottom, a wire-net lid and a partition of wire-net in the middle to separate the spiders from each other. They at once tried to get at each other, sticking their legs through the net. After a while they desisted and sat quietly on the ground. The next morning the female was found in the corner farthest from the light and next to the screen partition, in a little excavation in the ground, which was protected on all sides with web. The web was destroyed and a fly was held in a forceps before the spider. She bit at it but was either unable or did not want to kill it. The male made no excavation or web. When the partition was removed the male and female met several times in a rather threatening way, opening wide their mandibles and at times seizing each other by the mandibles, but the male would pat the female with his four front feet on the sides and back and then they would separate peaceably. After a short time the female dug rapidly a hole in the ground under a little stone. The male approached several times, touching her legs with his front legs and again going away. I now removed the stone to observe how the female digs the hole. She at once began to work, using all parts of her body. The small clumps of soil she removes by pushing them with palpi, front feet and mandibles with the fangs drawn in. Heavy clumps of the size of her own body she grasps in her fangs and either pushes or pulls backward out of the excavation. The hole is fortified by web which she spins in a very interesting manner. She stands head down with only the abdomen out of the hole and moves the latter in a half circle about the petiolus with spinnerets outstretched, fastening the thread first at one, then at the other end of the half circle. After doing this several times, she turns in the hole to spin the other half circle in the same manner.

Meanwhile the male came quite close and was evidently watching her, at the same time cleaning his legs and palpi by drawing them through his mandibles. After a while he again began his courtship; patted her back, standing face to face and tried to bring his front legs under her body. Later she left the hole without finishing it, returning to it from time to time. They met several times on the ground, always with mandibles wide open and touching each other with the four front legs. At times the female would make a threatening move toward the male upon which he would draw back, but invariably a rapid trembling would seize his four front legs, which lasted from 10-15 seconds. At times when she was out of the hole as though in search of something, he would occupy her place in it. On returning, she gently displaced him. Later as the female showed no intention of accepting the male, I separated them by means of the wire screen.

The next day was cold and rainy and both spiders were found in the morning in separate excavations covered up with earth and web. On the third day after a stormy night it became warm and the glass was placed in the sunshine. The screen was removed and the spiders pushed out of their holes. The male at once went to the female, meeting her face to face. He crept under her sternum and took her firmly by the petiolus between his mandibles with fangs drawn in. With his legs he embraced her in such a way that his right front leg passed between the mandibles (with fangs open) of the female and rested on her back. His left front leg passed between her right mandible and palpus and also rested on her back. The other legs passed similarly between the legs of the female and touched her back. She seemed to make no objection whatever. They tried several times to change their position, the female creeping from place to place while the male continued to cling to her. Finally she lay down on her side and he applied the palpus (at 10.43 A. M.), all the while patting her with his third leg. The coitus lasted five minutes, after which they slowly separated and going to opposite sides of the dish hid themselves in the ground. During the whole time the back of the male was in contact with the sternum of the female, a position not common to the majority of spiders.

In a recent paper on the courtship of araneids Professor Mont-

gomery objects to my conclusion that the sense of sight is the only sense that guides hunting spiders in finding the females during the mating period. He says that he has "frequently noticed males of even diurnal attids and lycosids first recognizing the female by touch." It seems to me however very doubtful that a male should approach a female without having previously noticed her or without having been noticed by her, so to say unawares on the part of both. The fact that the female may stay quiet is no proof that she has not noticed him. From my observations and experiments on hunting spiders I am convinced that they readily see moving objects. If frightened they run away; if conscious of their advantage and hungry or if cornered, they attack. What Montgomery looks upon as recognition by touch may be merely an attempt on the part of the male to find out whether the female is inclined to accept him. I do not deny that such a chance meeting is possible, but from what we know of the habits of spiders, I should expect the female to be either startled or resentful on being touched unawares. In the case of *Dysdera crocata*, which may in a certain sense be regarded as a hunting spider, the male shows every indication of perceiving moving objects and of recognizing the female by sight. Several times he distinctly watched the end of a hatpin with which I was breaking up the hard clumps of earth in a jar. Invariably on my ceasing to do this, he approached the spot and scratched at it with his front legs. As I have already stated he also approached the female whenever she began to dig. Reversing the conclusion of Montgomery that touch occupies the first place in the senses of sex-recognition and sight the second, I repeat therefore that sight is the only sense of sex-recognition in hunting spiders. After sex has been recognized, courtship begins, and touch is the chief means by which the male excites the female and tests her willingness to accept him.